Analysis of Network Revenue Management under Uncertainty

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Abstract: This paper investigates robust dynamic policies for network revenue management problems with uncertainty involved. We formulate such a problem in a setting of semi-definite programming and propose a heuristic procedure to find robust solutions. We also derive sufficient conditions for finding an approximation of the value function. Numerical experiments are included to illustrate the proposed approach.

Keywords: Robust optimization; dynamic programming; revenue management; uncertainty.

Mathematics Subject Classification (2000): 90B36, 90B15.

1 Introduction

This paper studies the revenue management problem on a given network in which all involved variables allow uncertainty. The optimal policy of the problem is investigated which determines what a quantity of resource should be offered at each different rate. The problem is important since we can find its broad applications, especially in airline network.

Revenue management is a technique concerned with a number of capacity constrained service industries such as airline, hotel, media, transposition, car rental, tourism and so on. Following the airline deregulation in 1970s, revenue management technique has

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